sset Management Definitio

ACE Risk and Reliability Worksh

August 15-18, 2006

David P. Hale, PhD
Aging Infrastructure Systems Center of Excellence
The University of Alabama

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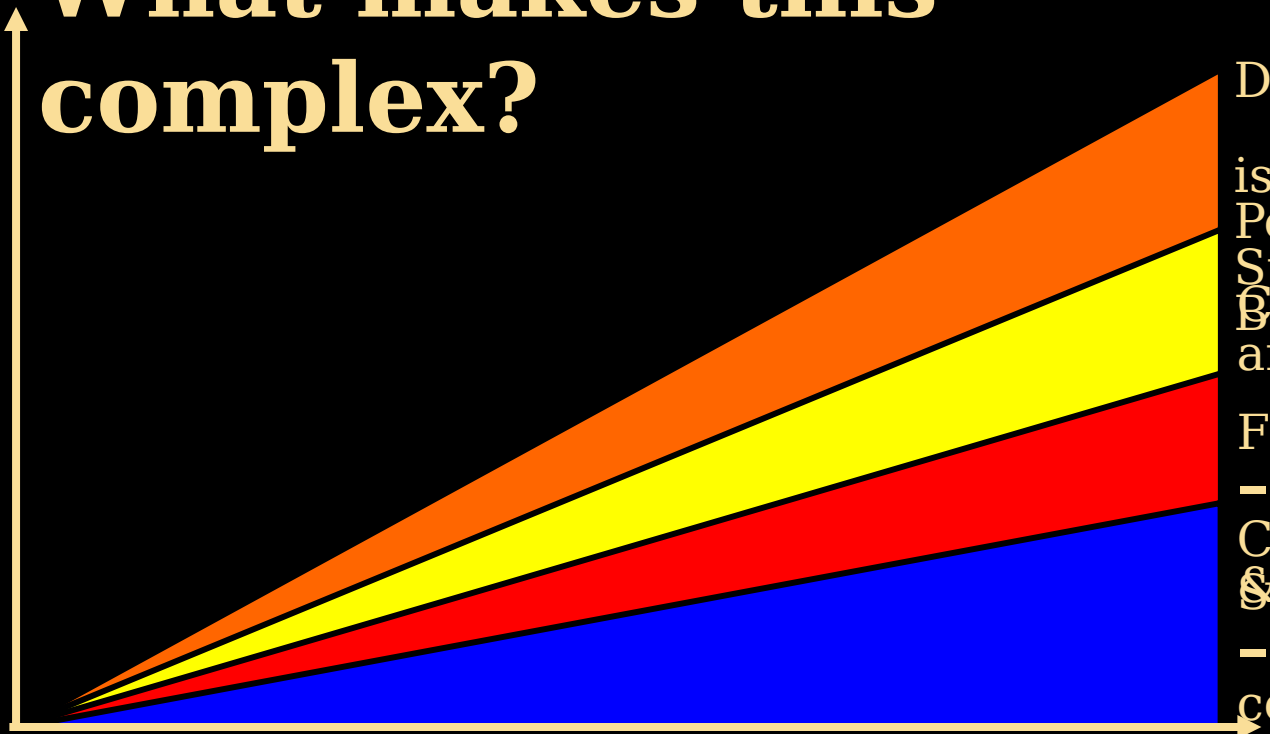
sset Management

What makes this complex?



Devil is in the Details –

is it about Operating Performance, Mx Strategies, PM and/or Budgets

Commitment – Buy-in and Staying the Course

Functional Obsolescence –

Changing Context, Use & Safety

Structural Deficient

– What and When to collect Data

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Assets Management Definitions:

- Large value product or service platforms that provide capabilities for other assets and people are termed *Infrastructure Systems*
- *Platforms* include Environments and Man-made Facilities.
- *Performance* is affected by Structural Deterioration and Functional Obsolescence
- *Robust Infrastructure* allows us to operate in a Safe, Healthy and Economical Society
- *Maintenance Strategies* can affect Robustness and Useful Life
- *Robust Maintenance* Strategies require an investment in resources, are data, model, and tool intensive

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What are the productivity problems?

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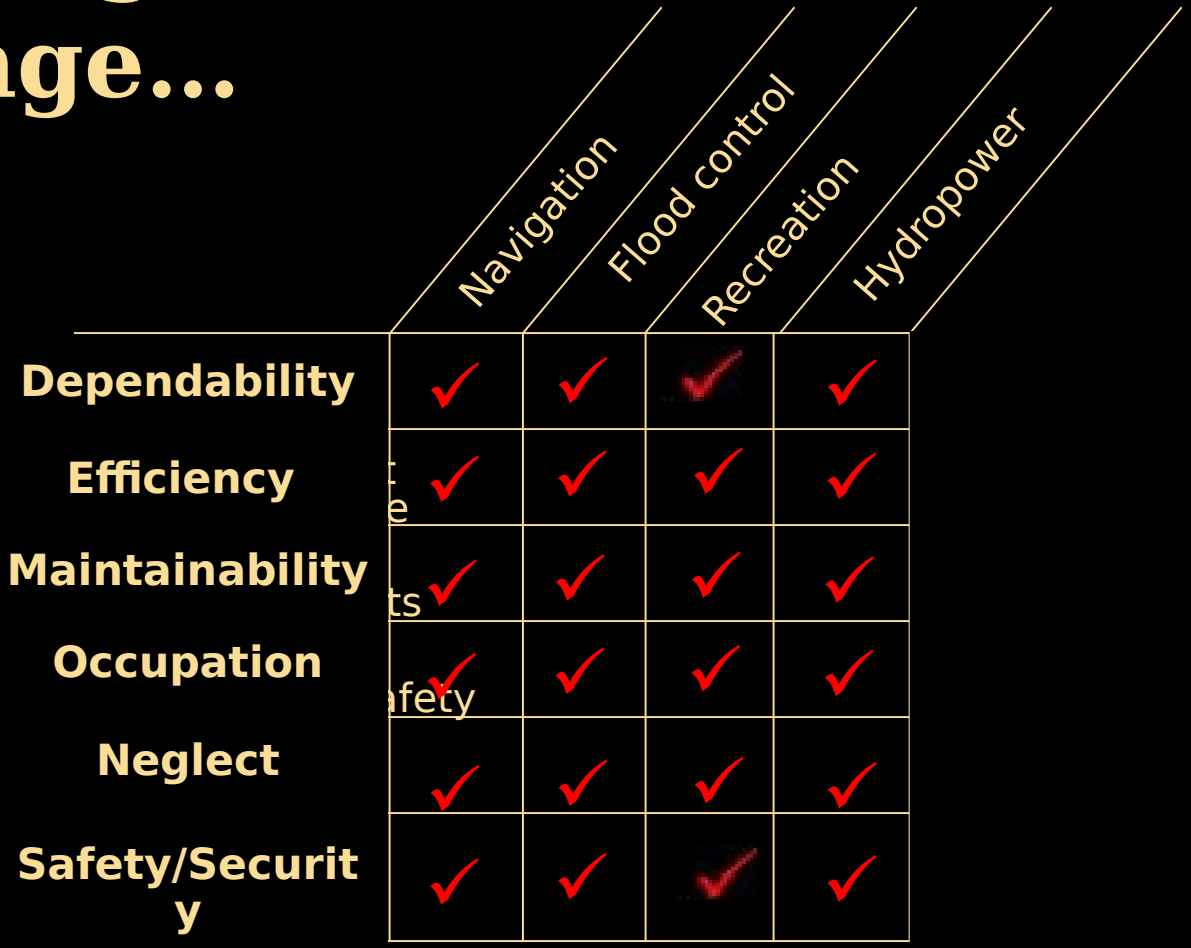
Deterioration: The DEMONS of Aging

The Deterioration Measures (DEMONS):

- Dependability (time between failures)
- Efficiency (cost to operate)
- Maintainability (time to repair, cost of repair)
- Occupation (workforce and organizational costs to maintain knowledge and skills)
- Neglect (costs to ensure system effectiveness caused either by entropy or changing system goals)
- Safety (costs to minimize injury) and Security (costs to protect)

The aging infrastructure challenge…



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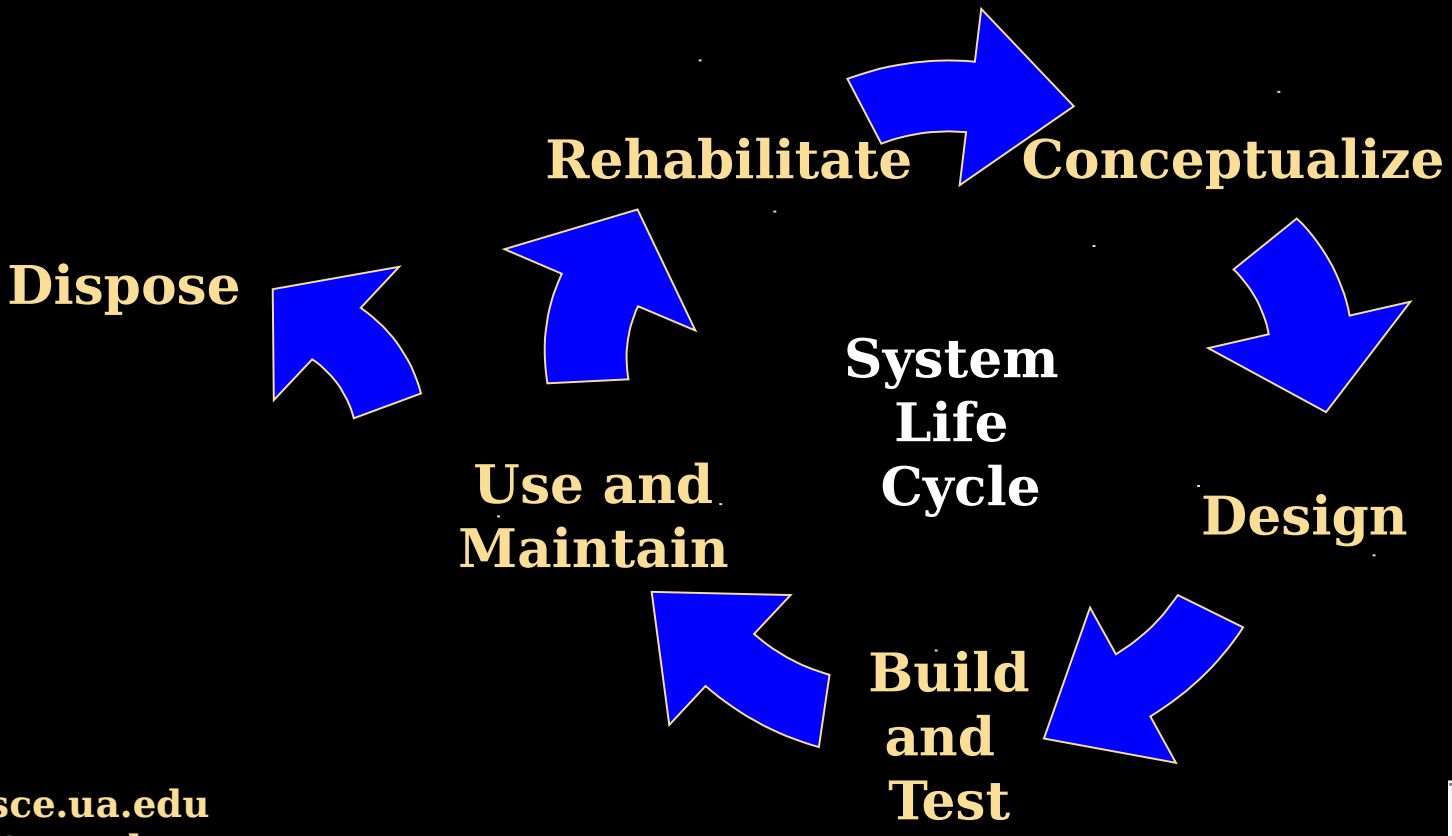
When Is Asset Mgmt Appropriate Decision Classification_

Mitigating DEMONS Effects Across Time



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Asset Management Decision Classification

Asset Level: Operational Item and Program Effectiveness through:

- **Monitoring of**
  - **Health Characteristics *(CI)***
  - **Performance**
  - **Interventions**
- **Data Collection Techniques**
  - **Defined and Consistent Data Elements**
  - **Defined and Consistent Collection Processes**
  - **Compliance Reviews**
- **Analyze trends across individual asset**

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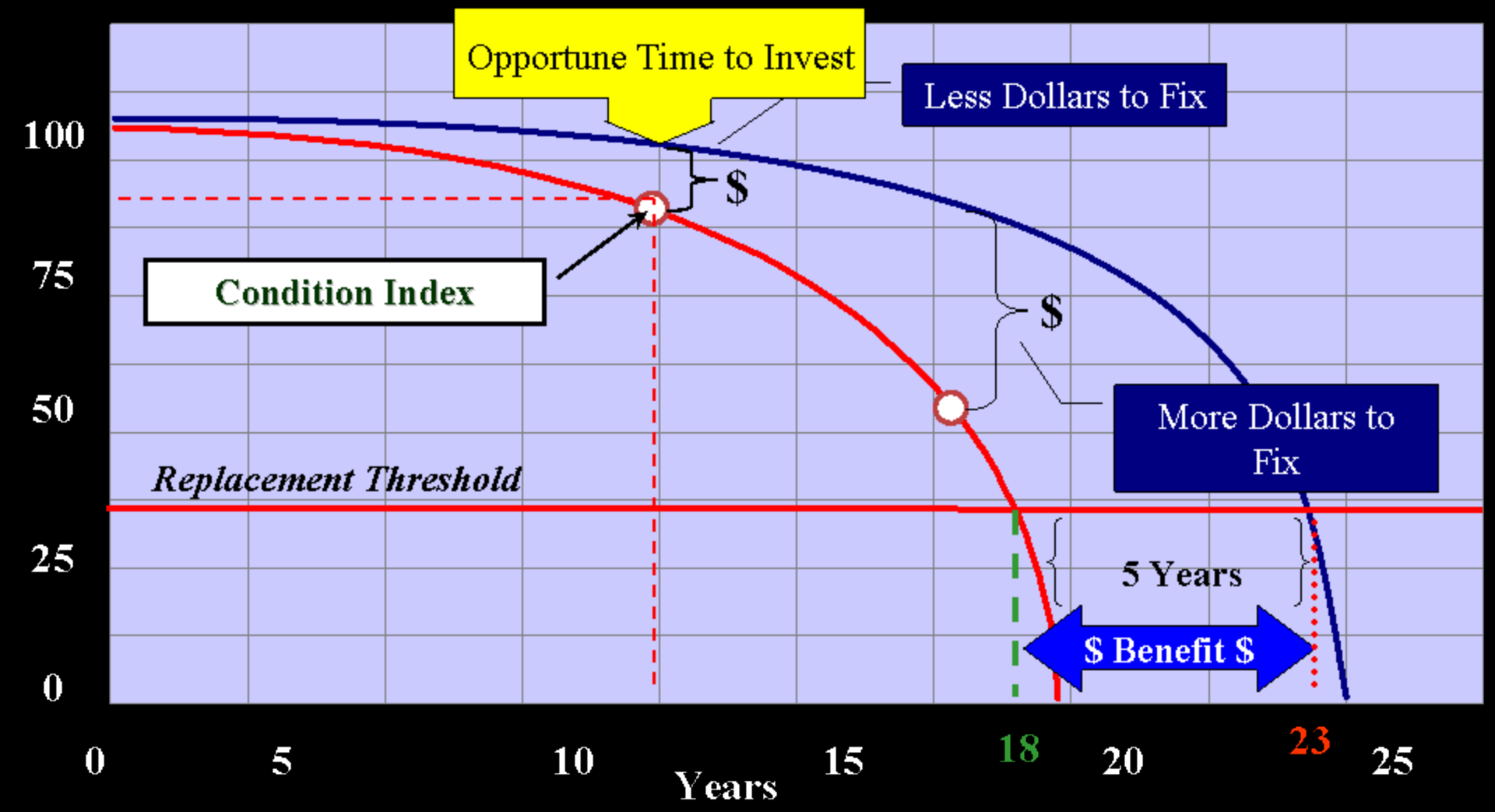
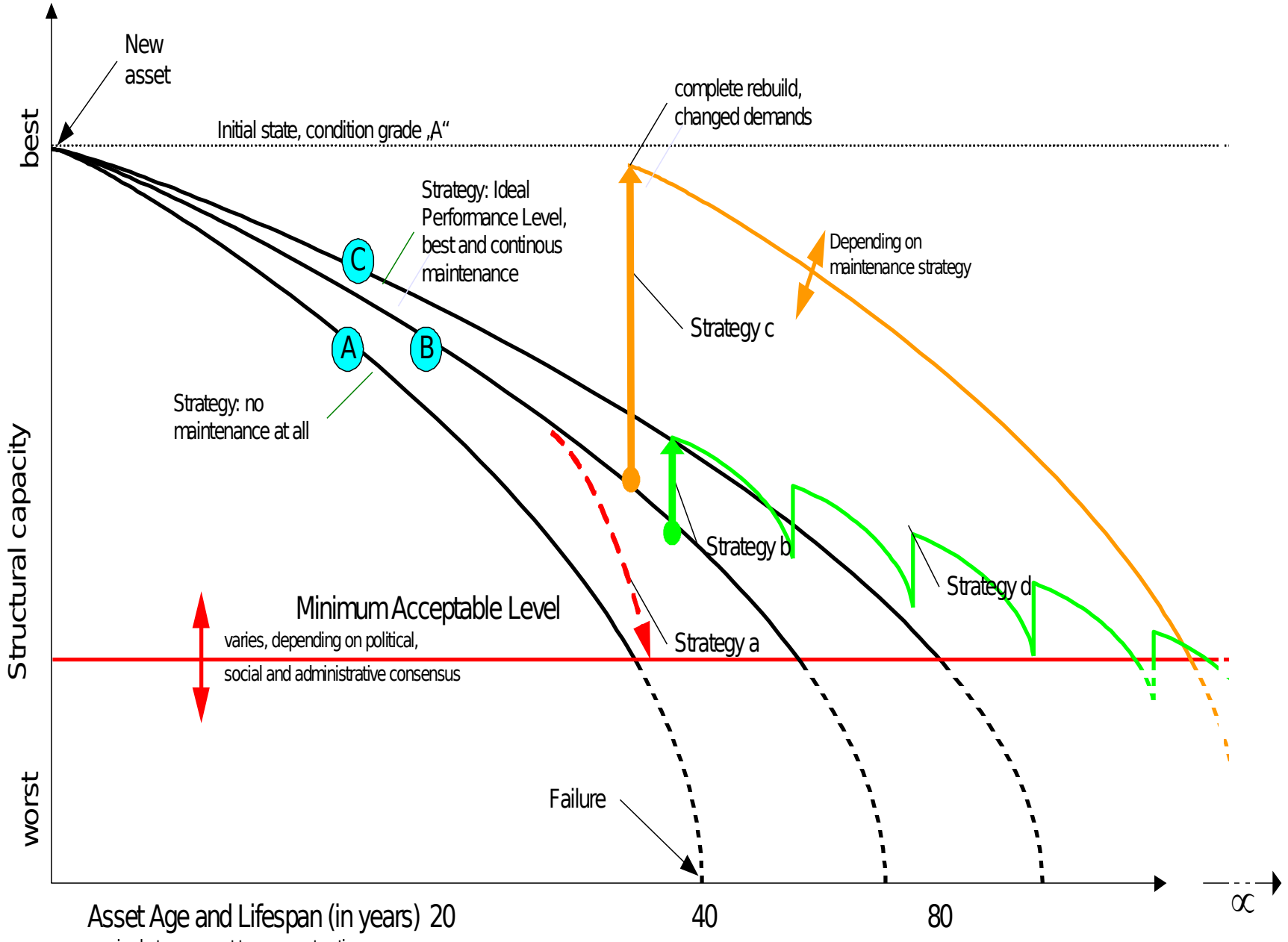
Life Cycle Analysis



FEA FACILITY ENGINEERING ASSOCIATES



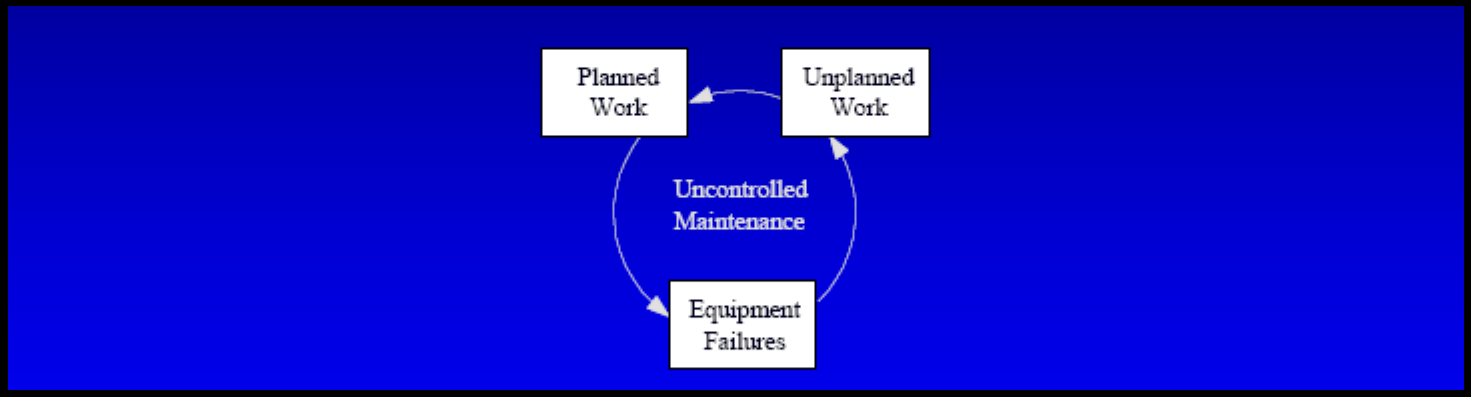
Sandra Knight, PhD, PE

Asset Management Decision Classification

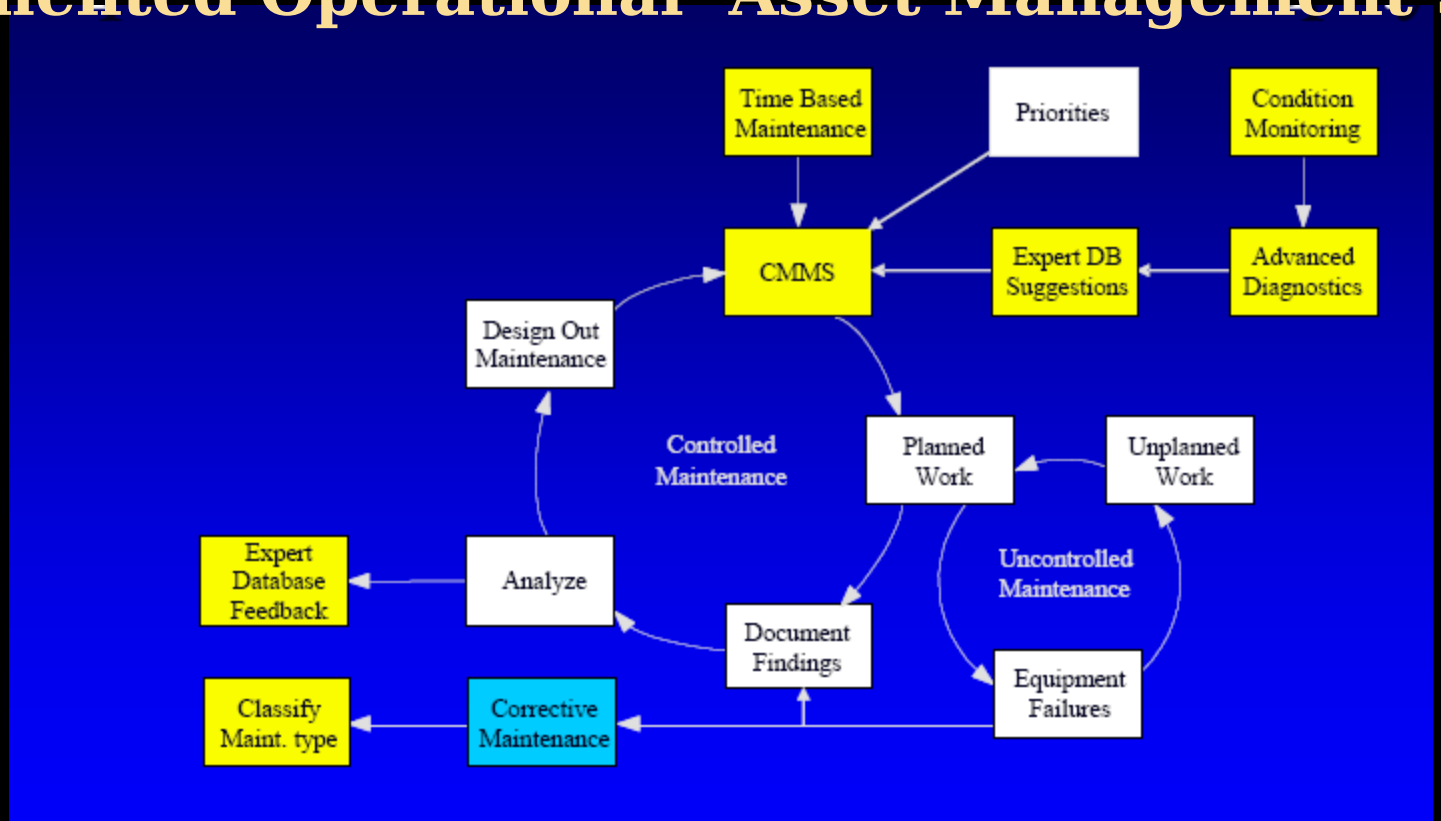
System Level: Optimize Tactical Maintenance Approaches through:

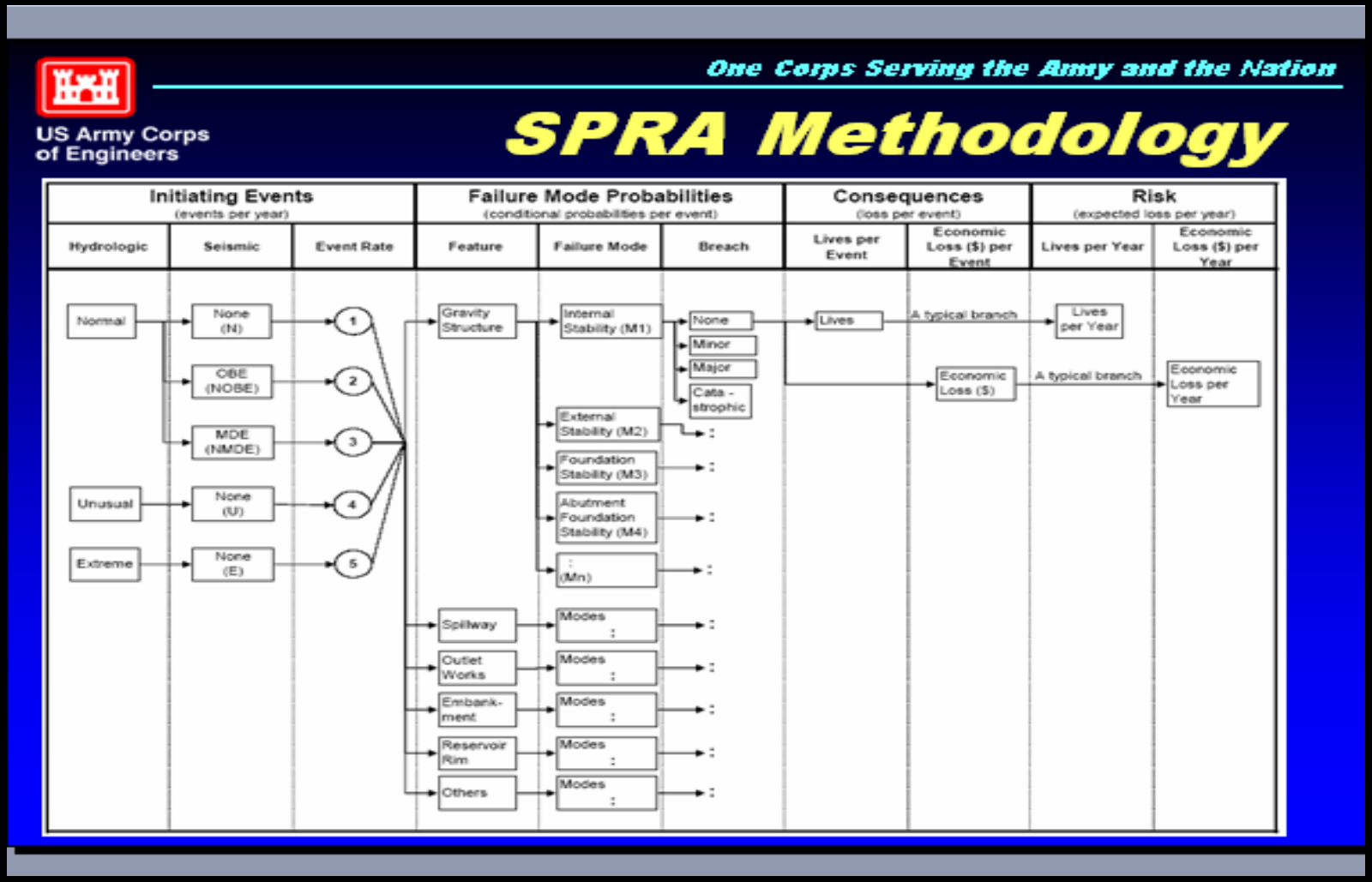
- Definition of Asset Families
- Forecast Performance over Time and Usage
  - Requires quality data over long periods of time
  - Substantial quantity of data
- Affects of Alternative Rehab/PM Intervention Actions
  - Predictive Maintenance (Operating Expense)
  - Rehabilitation (Capitalized Maintenance)
- Extreme Events Analysis

Canal Authority e-Maintenance System Conceptual

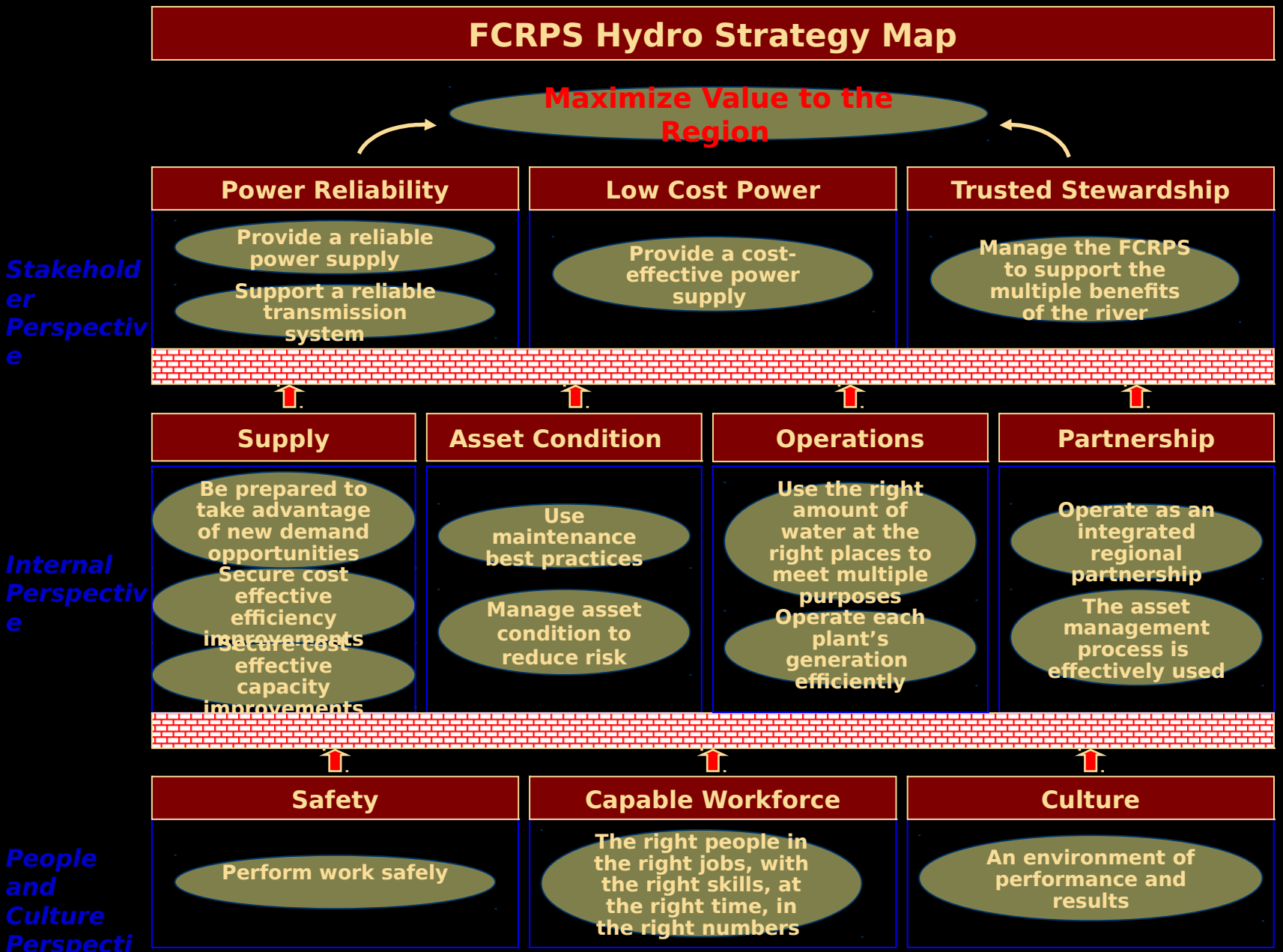


Implemented Operational Asset Management System





Portfolio Risk Assessment


FCRPS Hydro Strategy Map
Maximize Value to the Region
Power Reliability
Low Cost Power
Trusted Stewardship
Provide a reliable power supply
Support a reliable transmission system
Provide a cost-effective power supply
Manage the FCRPS to support the multiple benefits of the river
Stakeholder Perspective
Supply
Asset Condition
Operations
Partnership
Be prepared to take advantage of new demand opportunities
Secure cost effective efficiency improvements
Secure cost effective capacity improvements
Use maintenance best practices
Manage asset condition to reduce risk
Use the right amount of water at the right places to meet multiple purposes
Operate each plant's generation efficiently
Operate as an integrated regional partnership
The asset management process is effectively used
Internal Perspective
Safety
Capable Workforce
Culture
Perform work safely
The right people in the right jobs, with the right skills, at the right time, in the right numbers
An environment of performance and results
People and Culture Perspective

FEM/MAXIMO®

Charles Krahenbuhl

Asset Management Decision Classification

Macro Level: Strategic Public Polic

Decision Support through:

- Support for Policy and Regulates (alternatives, trade-offs, and consequences)
- Emphasis on:
  - Multi-Criteria Decision Analysis
  - Goal Programming
- Developing and Refining Financial Recapitalization
- Extending Risk-Based Outcome Analysis
- Cross Asset Family Portfolio Manageme
- May Use Alternative Data Source
Granularity

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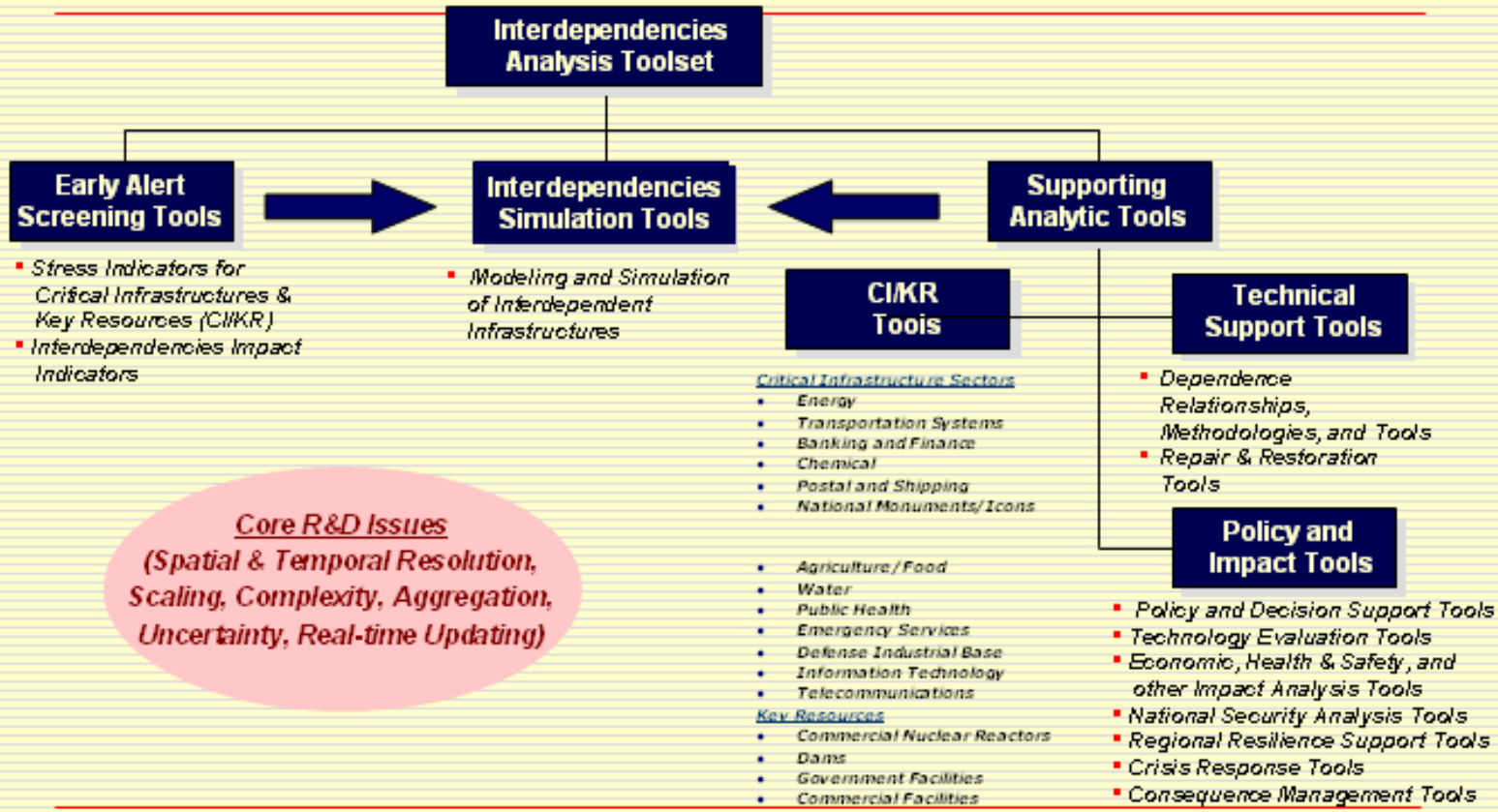
Interdependencies Analysis Tool Set



Paula Scalingi

President, The Scalingi Group, LLC

Granular Asset Management

Public Private Partnership Act of 2003 – H.R. 2573

Federal Real Property Disposal Pilot Program and Management Improvement Act of 2005 – H.R. 3134

Executive Order 13327 (2004)

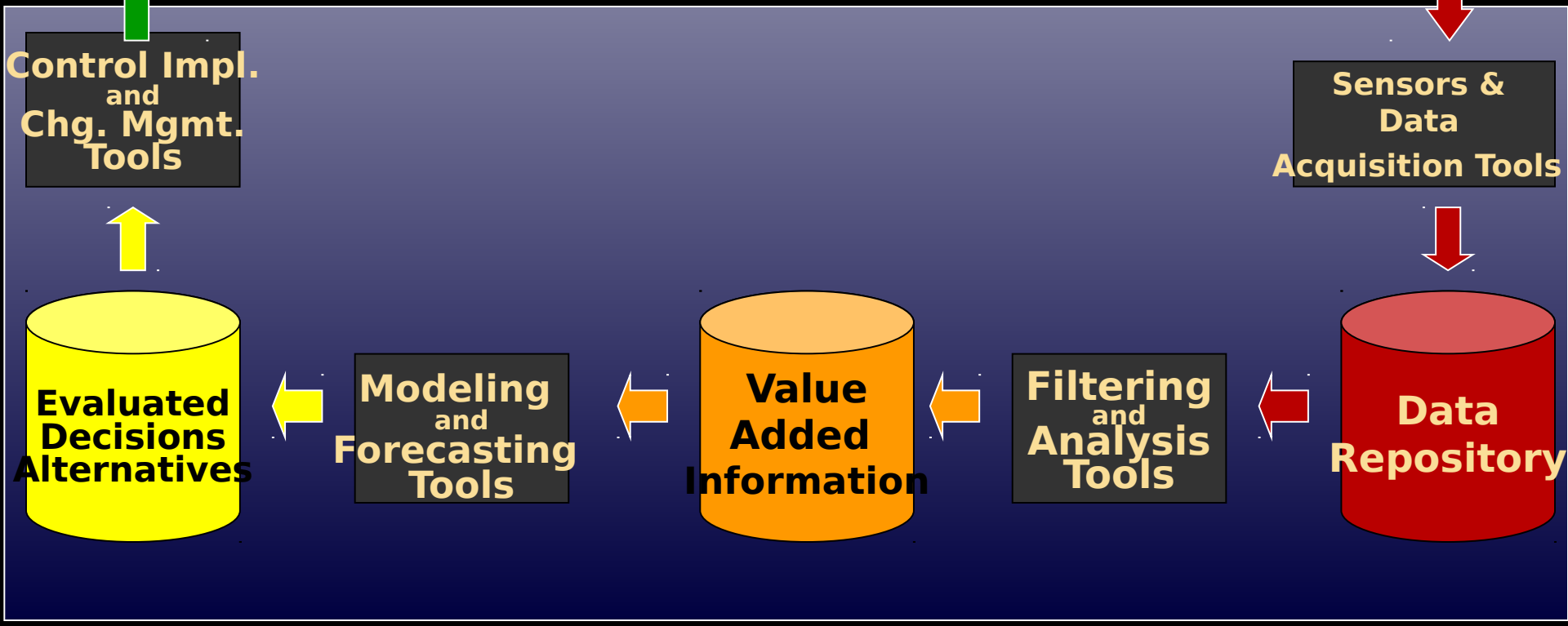
GASB 34

Intelligent Asset Management Phases

1. Detail the decisions that are going to be made through
   the Use of the Asset Management System
2. Define needed Metrics
3. Define Requirements to Produce the Metrics--Iterate among:
   - Algorithms
   - Data Availability/Quality/Cost
4. Obtain and Sustain Organizational Commitment
5. Develop Intelligent Command and Control Process

Intelligent Command and Control Process At ALL Levels

Aging Infrastructure



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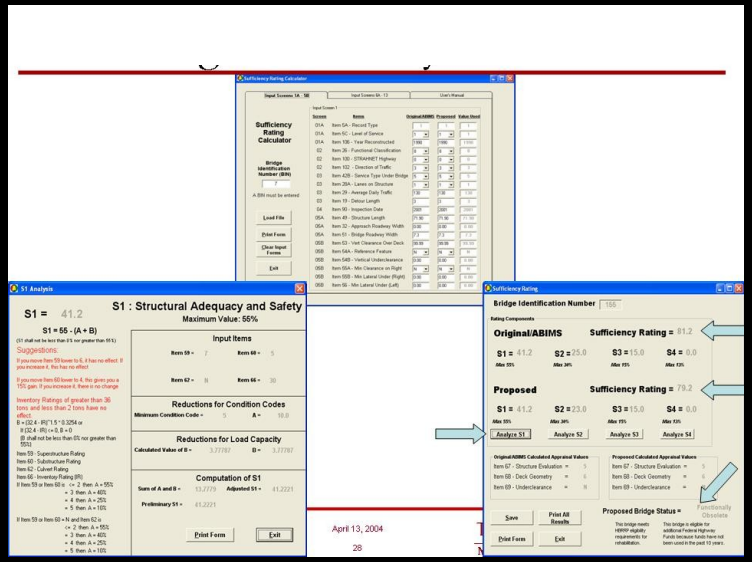
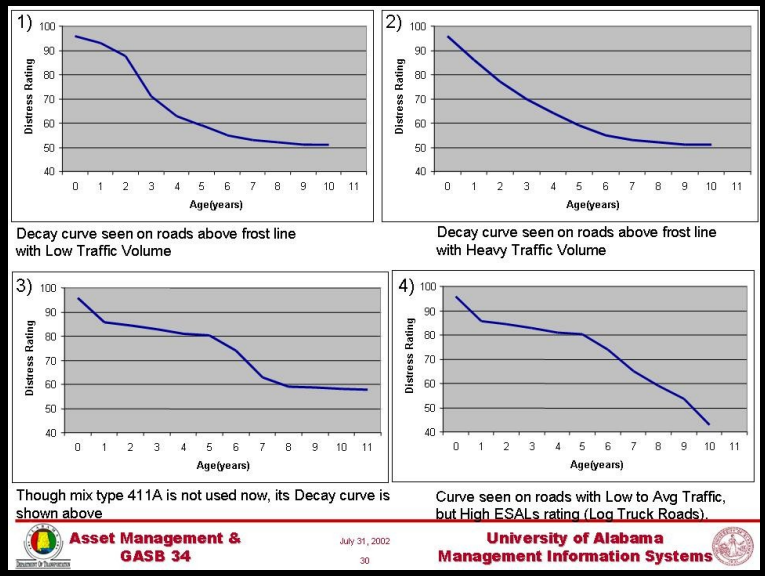
Asset Management (incorporating Alternative & Sensitivity Analysis)

Data Collection



Data Analysis


1)
2)
3)
4)
Distress Rating
Age(years)
Decay curve seen on roads above frost line with Low Traffic Volume
Decay curve seen on roads above frost line with Heavy Traffic Volume
Though mix type 411A is not used now, its Decay curve is shown above
Curve seen on roads with Low to Avg Traffic, but High ESALs rating (Log Truck Roads).
Asset Management & GASB 34
July 31, 2002
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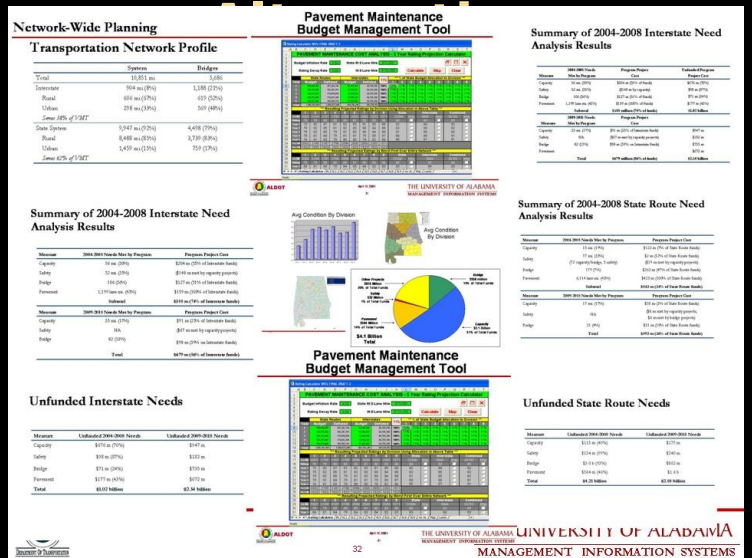
University of Alabama Management Information Systems

Development of


Network-Wide Planning
Transportation Network Profile
Pavement Maintenance Budget Management Tool
Summary of 2004-2008 Interstate Need Analysis Results
Summary of 2004-2008 State Route Need Analysis Results
Unfunded Interstate Needs
Unfunded State Route Needs
Pavement Maintenance Budget Management Tool
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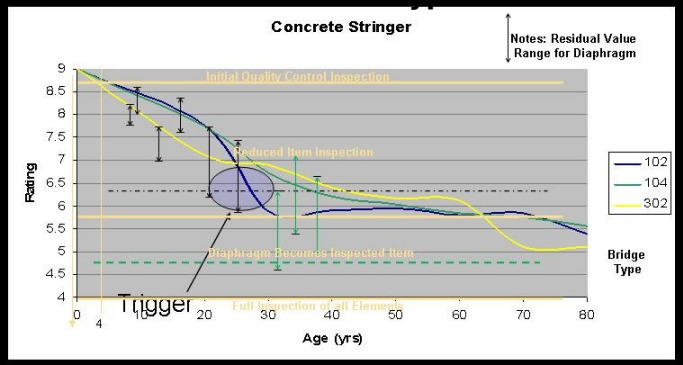
Forecasting to Develop Alternatives



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Cross Project Lessons Learned:

- The Difference between System Outcome and Asset Characteristic
- Using More than 1 Metric for Risk
- Customizing DEMONS as Risk Goal/Decisions Based Metrics
- Move Toward Defining Outcome-Based Risk
- Interaction Effects among DEMONS
- Financial Interrelationship among New Constructio Ops, & Mx
- Disciplined Committed Process Requiring Multiple Cycles
- Change of Use (Func'l Obsolescence) & Increased Capacity Demands

Aging Infrastructure Systems Center of Excellence

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